The total area occupied by the passes =0.0110X 704= 7m² 75
The total area occupied by brick =0.0214X 704= 15m² 07
Checker area = 7.75 +15.07 = 22 m² 82
The perimeter of one pass =0.105 X 4= Om 42
The total perimeter =0.420 X 704= 295m 68
The heating surface =295.68X 25 = 7392m² 00
Heating surface per cubic meter of free air per second =7392 -- 16.78= 44m² 05
Heating surface per cubic meter at pressure and average temperature - 7392 -^ 23.33 = 31m² 68

The average heat transfer rate will be 4586-^7392 = 0.6204 calories per square meter per second for the existing differential.

The average velocity of flow of the air through the checker will be 23.33-^7.75 = 3 m 01 per second.

The frictional resistance in the checkers by Mojarow's formula will be 42 mm 80 of water, while there will be a hydrostatic pressure upward of 9 mm of water, so that the drop through the checker will be 33 mm 80 of water.

The possibility of increase in blast temperatures is limited by the possible temperature which may be realized from the combustion of blast-furnace gas. Mallard and Le Chatelier, in the course of their work for the *Commission de Grisou,* determined the heat capacity of various gases. Working with these data, it is possible to approximate the instantaneous calorific intensity of combustion of various fuels under athermal chamber conditions, as well as the effect of preheating the air or the gas, or both. Such a curve has been computed for a blast-furnace gas having a volumetric composition of H_2 = 3.92, CO = 23.95, 02 = 0.39, $C0_2$ = 12.96, H_20 = 1.65 and N_2 = 57.13. This gas has a thermal value of 1861 calories per 100 molecular volumes (2 m^3 232) equivalent to 835 calories per cubic meter and 93

B.t.u. per cubic foot. This curve (Pig. 181) shows intersection points which may be read to approximate the temperature which may be realized from the combustion of this gas with various air supplies and preheating conditions.

Table No. 5 gives computations, which are believed to be self-explanatory, for the plotting of the curve. In making them, however, it has been assumed that the air is composed of 1 volume